In the Claims

1. (Currently Amended) A solenoid comprising:

a magnetically conductive shell having a single coil of wound wire;

a movable magnetic object disposed within a bore of the single coil, the object configured to receive a magnetic force when current is induced in the single coil; [[and]]

a permanent magnet having a fixed polarity that repels the moveable magnetic object when current is induced in the single coil and attracts an end of the movable magnetic object when no current is induced in the single coil][[.]]; and

a non-magnetic spacer disposed between the permanent magnet and the movable magnetic object.

2. (Original) The solenoid of claim 1 wherein the moveable magnetic object includes one of a plunger or an armature.

3. (Canceled)

4. (Currently Amended) The solenoid of claim [[3]]1 further comprising a return spring operationally connected to bias the movable magnetic object in a return position against the spacer when no current is induced in the single coil.

5. (Original) The solenoid of claim 4 further comprising an end plate connected to an end opposite to that of the return spring and an attracting stud connected to the end plate, the attracting stud having a polarity opposite to that of the movable magnetic object when current is induced with a specific electrical polarity in the single coil.

6. (Original) The solenoid of claim 5 further comprising a housing having the single coil, the plunger, the spacer, and a bobbin disposed therein.

7. (Original) The solenoid of claim 6 wherein the single coil is wrapped around the bobbin.

8. (Original) The solenoid of claim 7 further comprising a number of shunt components connected to the bobbin.

9. (Original) The solenoid of claim 8 wherein the number of shunt components is configured such that as distance of the shunt components from the permanent magnet increases a hold force between the plunger and permanent magnet decreases.

10. (Original) The solenoid of claim 8 further comprising an air gap between the number of shunt components and the housing.

11. (Previously Presented) An electromagnetic switching apparatus comprising:

a bobbin having a single coil of wire wrapped therearound;

a movable armature disposed within the single coil; and

a permanent magnetic separated from the armature by a non-magnetic spacer wherein the permanent magnet attracts the armature when the single coil is de-energized and repels the armature when the single coil is energized.

12. (Original) The apparatus of claim 11 further comprising an end plate and attracting stud connected to one end of the bobbin wherein the attracting stud attracts the armature when the single coil is energized.

13. (Original) The apparatus of claim 12 further comprising a return spring configured to bias the armature against the spacer when the single coil is de-energized.

14. (Original) The apparatus of claim 13 wherein the armature is further configured to have a first polarity when the single coil is de-energized and a second polarity when the single coil is energized.

15. (Original) The apparatus of claim 14 wherein the second polarity matches a plurality of the permanent magnet.

16. (Original) The apparatus of claim 14 wherein the second polarity is opposite to a polarity of the end plate.

17. (Original) The apparatus of claim 11 further comprising a plurality of shunt components disposed radially around the actuator between the single coil and the permanent magnet.

18. (Withdrawn) A method of manufacturing a single coil solenoid with permanent magnet bi-directional assist comprising the steps of:

wrapping a single electro-conductive wire around a bobbin;

securing a plunger within a bore of the bobbin;

disposing a spacer and a permanent magnet at one end of the plunger;

biasing the plunger in a first position against the spacer; and

placing an end plate having an attracting stud at an end of the bobbin opposite to that of the permanent magnet.

19. (Withdrawn) The method of claim 18 further comprising the step of securing a return spring to be operationally connected to the plunger such that the return spring biases the plunger against the spacer when current is not induced in the wire.

20. (Withdrawn) The method of claim 18 further comprising the step of configuring the plunger to have a polarity similar to that of the permanent magnet when current is not induced in the wire and to have a polarity opposing that of the permanent magnet when current is induced in the wire.

21. (Withdrawn) The method of claim 18 further comprising the step of placing a set of shunt components radially around the plunger between the permanent magnet and the wire.

22. (Currently Amended) A single coil solenoid comprising:

a first magnetic circuit between a plunger and a permanent magnet spaced from the plunger by a non-magnetic spacer at a first electromagnetic condition created when a single coil of wire is not energized; and

a second magnetic circuit between the plunger and an attracting member at a second electromagnetic condition created when the single coil of wire is energized.

23. (Previously Presented) A solenoid kit comprising:

a bobbin configured to receive a single coil of wire wrapped therearound;

a permanent magnet having a fixed polarity;

an armature configured to move linearly through a bore of the single coil bobbin; and

a non-magnetic spacer to be disposed between the permanent magnet and the armature.

24. (Original) The kit of claim 23 further comprising a housing and an end plate connected to the housing, the end plate including an attracting stud having a polarity opposite to that of the permanent magnet.

25. (Original) The kit of claim 23 wherein the armature is configured to have an attraction to the permanent magnet when no current is induced in the single coil.

26. (Original) The kit of claim 23 further comprising a return spring connectable to the armature.